state of process work will be astonished at the wealth and efficiency of methods that are at his service as shown by the admirable specimens which are included in this volume.

The present issue is considerably larger than its predecessors, both the articles and illustrations being more numerous; greater prominence is given also to the work of various technical schools and institutions.

Enough, perhaps, has been said to indicate the value of this book, which so beautifully portrays the present stage of advancement in process work.

Geometrie der Dynamen. By E. Study. Two vols. Pp. xiii+603. (Leipzig: B. G. Teubner, 1901 and 1903.)

THE title of this book is somewhat misleading. The object of the first two parts is the discussion of certain geometrical theorems. From these the laws for the composition of wrenches (Dynamen) can be deduced as particular cases. To this special application, from which the book takes its title, only pp. 116 to 121 are devoted. In the first part of the book the geometrical theorems (which deal chiefly with the composition of vectors, wedges, motors, &c.) are proved by purely geometrical methods, and the reader is assumed to have only a good working acquaintance with pure geometry, and in particular a knowledge of the theory of the composition of screws and translations (such as is supplied, for instance, in Schoenflies's "Krystallsysteme und Krystallstructur," pp. 326 to 340). In the second part the analytical proofs of the same geometrical theorems are given, but the author still confines himself to elementary methods. The third part, which contains the larger portion of the book, appeals to a more advanced class of readers who are familiar with the method of modern analysis and the theory of groups. Here the author seeks to supplement the work of Plücker, Ball, and Sturm, and to give a complete discussion and classification of linear line-complexes. A good index and table of contents are given in the second volume. H. H.

The Schoolmaster's Yearbook and Directory, 1904. Pp. lx+1030. (London: Swan Sonnenschein and Co., Ltd., 1904.) Price 5*s.* net.

THIS is the second annual issue of a very useful publication. It is, what on the title-page it professes to be, a reference book of secondary education in England and Wales. The book consists of two parts; the first contains general information and the second comprises lists of secondary schools for boys and of the masters who teach in them. The general information would have been more useful and more easily accessible had it been considerably condensed; for the essential matter in works of reference is to have the important facts clearly presented with a minimum of description. The "Yearbook" is, however, sure to be widely used, and deserves the popularity it has secured.

Junior Country Reader. I. True Animal Stories By H. B. M. Buchanan, B.A., and R. R. C. Gregory. Pp. vi+121. (London: Macmillan and Co., Ltd., 1903.) Price 1*s.*

THESE tales, told in very simple language, are sure to please children of seven or eight years of age. The stories are founded on fact—some of them upon observations recorded from time to time in NATURE. The illustrations, from photographs by Mr. Charles Reid, are numerous and good. The book should serve excellently to awaken in children an interest in animal life.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

Destructive Action of Radium.

IT may interest some to know that radium destroys vegetable matter. I happened to replace the usual mica plates, used to keep in the small quantity of radium in its ebonite box, with a piece of cambric, so as to permit the whole of the emanations to pass out, mica stopping the α rays.

In four days the cambric was rotted away. I have replaced it now several times with the same result.

BLYTHSWOOD.

Blythswood, Renfrew, N.B., February 1.

Phosphorescence of Photographic Plates.

WITH reference to letters in NATURE of January 28 and preceding numbers, on "Phosphorescence of Photographic Plates," it seems to be not out of place to direct the attention of those interested in the subject to *Wiedemann's Annalen* of 1888, vol. xxxiv. There will be found, on pp. 918–925, information which may prove of use in further investigation. P. LENARD.

Kiel, January 31.

The French Academy.

WHAT Mr. J. Y. Buchanan says (p. 293) about the French Academy is to me much more wonderful than the revelations of radium. It appears that there is a happy land close by where a scientific man of recognised standing can indulge in the luxury of original research, and then send in an account of his work, *not* to have it rejected by the opinion of, say, a couple of fellow-men, but actually to have it published as a right! This seems impossible. It is the encouragement of original research. Perhaps it is hopeless to expect such freedom in this stick-in-the-mud country, which is so much in love with tradition and antiquated forms. Without any desire to be "contumelious," I would say that our Royal Society reminds me of the House of Lords in many respects. OLIVER HEAVISIDE.

January 31.

Ambidexterity.

IN certain schools, notably, for instance, in Mr. Liberty Tadd's art schools in Philadelphia, children are taught to become ambidextrous, at least to a considerable extent. The advantages of this plan have seemed to be evident, but Mr. Wm. Hawley Smith, the well-known writer on educational topics, has lately (*School and Home Education,* March and October, 1903) argued against it. In a letter just received from him, his views are concisely summed up as follows:—"My notion is, that it is not worth while to try to make *all* our children ambidextrous. I believe that it is *far* wiser to follow nature's lead, with each individual child, and develop them in the use of their hands as they naturally wish to use them. . . . I am sure that, in most cases, we shall fail to secure real skill with *either* hand if we strive to train *both* to do the same work." Mr. Smith further argues that it is hard enough to train one hand to do the more complicated kinds of work, and that it does not pay to waste energy trying to accomplish the more difficult feat of training both. Of course the validity of this argument depends largely upon the assumption that the lack of coordination ordinarily seen in adults is inherent, and not the result of acquired habit, or not largely so. It is perhaps allowable to suggest that this point has not yet been fully decided. It is also a question whether the relative inability of one hand is correlated with an inefficiency of the opposite side of the brain, or putting it another way, whether the extra muscular activity necessary to train two hands instead of one involves a similar increase in mental activity.

There is, however, a third possible plan to follow. While I am in nearly all respects right-handed, I draw with my

left hand, and have always done so from earliest childhood. Without being able to prove it, I have believed that this specialisation of the hands was advantageous. With my right hand I cannot draw at all, nor can I write with my left, except, of course, as anyone can, very badly. If it is a fact that to train the left hand for special purposes, such as drawing, is advantageous, this is worth knowing. Its theoretical explanation would agree very well with the views of Mr. Smith, and it seems to me that there is enough probability in the idea to make it worth following up. Perhaps some of your readers may be able to throw light upon it. T. D. A. COCKERELL.

Colorado Springs, Colo., U.S.A., January 13.

Science at Oxford and Cambridge.

IT is very surprising to find Prof. Perry charging Oxford with fearing and hating natural science.

Nearly thirty years ago I was engaged in a cave research which involved geology, zoology, and archæology, as bearing on the cave, its fauna, and objects of human workmanship. One of my colleagues was Mr. W. Bruce Clarke, and I derived valuable assistance from Prof. Boyd Dawkins. Both these gentlemen took first classes in natural science at Oxford. Some years afterwards I investigated the dentition of Aplysiæ. This work was subsequently taken up and completed by another Oxford man, Mr. Walter Garstang. I had been myself much assisted by the Rev. T. R. R. Stebbing, F.R.S., formerly tutor of Worcester College, Oxford.

So far as Cambridge is concerned, in two other subjects I took up, viz. sea-waves and petrology, there was no need to go outside the university, and I may say that the greatest authority on the dentition of gastropods is the Rev. Prof. H. M. Gwatkin, who cannot be persuaded to publish a line on the subject, to the very serious loss to science.

From what I can observe the training of both Oxford and Cambridge is so excellent that the better men are fit to do first-rate work in almost any branch of natural science. As I have said, Prof. Gwatkin is the authority on the dentition of gastropods, while the author of the treatise on molluscs, in the "Cambridge Natural History," is the Rev. A. H. Cooke, a senior classic.

Then we find a senior wrangler, who was not a chemist, setting up a laboratory at home and discovering argon. Then again, we had that wonderful professor of mathematics, the late Sir G. G. Stokes, illuminating every physical subject he approached. I had two correspondences with that illustrious worker, in one of which he conducted me to the very edge of the known, and concluded with the sentence (referring to a paper), "You will be able to judge how far what you have observed may be additional to what is there given." I think that is the distinction between Cambridge research and much modern work. The latter is greatly a matter of text-books and the opinions of authorities. The Cambridge man has conducted you to the absolute front before you know where you are, and there he leaves you to work alone. That has happened to myself repeatedly. The modern school is a little apt to give and take opinions. It is as hard to get an opinion out of a typical Cambridge man as a direct answer from a Quaker. Cambridge has no use for opinions. A. R. HUNT.

Curious Shadow Effect.

IN connection with the "Curious Shadow Effect" mentioned by your correspondent, Mr. H. M. Warner (NATURE, January 28, p. 296), may I be permitted to direct your attention, and his, to a somewhat peculiar "species" of Brocken which I attempted to describe some years ago in the *Scottish Mountaineering Club Journal* (vol. ii. pp. 32–33, 1893)? I ask this, not with any idea of replying to Mr. Warner's inquiry, but to ask another question which perhaps may be answered at the same time. Referring to the above mentioned note, I ask the question, "How was it that more than one image was visible to each of our party?" "Standing close together, all five or six images were visible, all within the wide outer halo; but of course, not one of us saw more than one set of concentric rainbow bands or circles—R.O.Y.G.B.I.V.—and at the lower limbs of the halos nothing of our reflections could be seen, because we were standing slightly *below* the dip of the ridge."

The time of day was between 11 a.m. and noon, and the date was November 24, 1903. In Mr. Warner's case the date was still nearer to mid-winter, and the time of day "near setting" (*i.e.* "within an hour of setting"), and therefore considerably after noon, as shown in the sketch of position. How are the rays affected by refraction and reflection?

I have never seen nor heard of a quite similar Brocken, so I named him "The Brocken of Tarduff" (Hill in Stirlingshire). JOHN A. HARVIE BROWN.

Dunipace, Larbert, Stirlingshire, N.B., January 29.

Subjective Images.

IN corroboration of Prof. Herbert McLeod's observation (p. 297) as to the bright red appearance of printing when the eyes were exposed to the glare of a white chalk road, will you allow me to record an effect I have several times seen when walking over snow while facing bright sunlight? On such occasions every dark object on the snow, and even the shadows in small deep depressions in the snow, have all appeared to me of a vivid blood-red colour.

As to an allied point, I should be glad to be allowed to ask whether the experience of other observers coincides with my own as to the tint of objects seen when the eyes are unequally illuminated. If one eye, right or left, is in full light, and the other shaded (the hand will give shadow enough), then, by closing the eyes alternately, I always find that the field of vision of the shaded eye is of a distinctly warmer tint than that of the eye in full light. If, as Sir Michael Foster says, both eyes respond equally to a stimulus applied only to one, then the explanation which naturally suggests itself, that the difference in the tint of the light seen is in some way dependent on the differing expansion or constriction of the two pupils, becomes inadmissible.

Kew, January 30. E. HUBBARD.

Use of the Kinematograph for Scientific Purposes.

BY means of the kinematograph it is possible to show to the eye the whole course of a visible phenomenon, either at the rate at which it actually happened or at any faster or slower rate that may be desired.

Already it has been made use of to exhibit many phenomena the actual rate of happening of which is too rapid to admit of direct visual perception, as in the case of sound waves and the flight of bullets, but there would seem to be as great possibilities of useful application to render the progress of *slow* motions perceptible. For example, the changes in a cloudy sky are usually so gradual that it is difficult even for a close observer to form a definite mental picture of what has happened in the upper air during, say, a few minutes or a few hours. This difficulty is due not merely to the slowness of the changes, but to their complexity. But suppose that under favourable conditions a good cloud-scape could be photographed, say, 500 times in an hour, and the results put through a kinematograph in one minute, it could hardly fail to help the meteorologist to get a clearer idea of what really happens above us, especially as for purposes of study the *same* phenomenon could be made to pass before the eyes of the student as often as he might desire. Perhaps our meteorological observatories may carry this method far.

Again, suppose a similar application made to the growth or flowering of a plant. I imagine that few botanists have the patience and power of concentration that would be required to get as clear and definite an idea of such a process by direct observation as one could easily acquire by the aid of the kinematograph, and even supposing a botanist possessed a perfect mental grasp of the process, if he wished to describe it to an audience would he not find the kinematographic representation of it an invaluable aid?

No doubt many other possibilities will suggest themselves at once to the reader. R. F. M.